

remain near to the ring and are used. The remaining front wall is not being used at a distance from the sitting place, i.e. the ring. In other words when male *P. benghalensis* sits on the ring of its own nest, it can touch every point of the three inner walls by its bill while it is difficult to *P. philippinus* which can touch

two inner lateral walls only. That is why *P. benghalensis* can use all the three inner walls of the eggchamber of its nest while *P. philippinus* can plaster the two inner lateral walls only. (See fig. 5).

I am grateful to the Bombay Natural History Society for providing necessary guidance.

FORESTER,
I/C MIXED PLANTATION,
TATAR PUR (ALWAR-RAJ.)-301 424,
July 10, 1984.

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18. A GHARIAL (*GAVIALIS GANGETICUS*) AT GAHIRMATHA COAST, ORISSA, INDIA

(With a photograph and a text-figure)

Referring to Annandale's (1915) statement about the occurrence of gharial (*Gavialis gangeticus*) in the Chilka lake, Singh (1978) held the opinion that since the local fishermen interviewed at Puri and Balugan were ignorant of the occurrence of gharial in this brackish water lake, gharial may be entering the lake accidentally during the monsoon floods through a tributary of the River Mahanadi. However, discussing the occurrence of gharial outside freshwater, Singh (1978) did state that in spite of the popular belief that the species remains away from estuaries, they are known to have occurred in the past in the "brackish waters near Kendrapada-Patamundai in lower Mahanadi, not far from the Bay of Bengal".

Supporting the above view regarding the possible occurrence of the gharial outside freshwaters, we have recorded a case in the Gahirmatha coast, Bhitarkanika Wildlife Sanctuary, Orissa, where a female gharial approx. 3 m in length was sighted on the sea shore. Observations recorded are presented below and the gharial with the sea in the background

is seen on photo (1).

During a beach patrol for olive ridley's nesting emergencies, a gharial was spotted basking on the beach on 30th January, 1985 at 1700 hrs. about one kilometre south-west of the village Kanpur (Fig. 1). On 31st January at 1600 hrs. it was again sighted at 1 km south-west of the Gahirmatha Marine Turtle Research and Conservation Centre located at 'Habalikhati'; thus the shift was about 7 km towards north in 12 hrs. On the same night when we tried unsuccessfully to capture the animal at 2000 hrs. it was sighted near 'Antamahalhana' at 1.8 km further north from 'Habalikhati'.

On 1st February, 1985 at 0845 hrs. the gharial was seen basking 2.4 km away from the previous recording. It moved about 100 m within 30 min. The last sighting of the gharial was at 1345 hrs. when it moved 2.5 km further north. No further observations were taken as we had to shift our camp.

Therefore, during 3 days the gharial had moved 13.7 km north of the first sighting.

Two of the movements were: 7 km in 25 hrs. (30.1.1985) and 2.5 km in 0430 hrs (1.2.1985). These observations recorded on the coast augment the species' movement records in Satkoshia Gorge Sanctuary given by Bustard and Singh (1984).

The direction and flow of current in this part of the Bay of Bengal is from South to North (Bhanj Deo, Undated). Therefore, without much effort in swimming the gharial was just being taken away by the currents although the animal may be attempting to find a suitable place for basking on the beach and/or a freshwater habitat for retreating back. Everytime we approached close the gharial moved towards the open sea. However, throughout the 3 days observation period the gharial was observed swimming only within 50 m of the shore, raising its head frequently.

Singh and Bustard (1982a, b) stated that the gharial is extinct in the Brahmani and Baitarani systems to the delta of which Gahirmatha is close. Therefore, the present gharial is likely to have migrated from the Mahanadi where resident population still occur and where a rehabilitation programme is in operation (FAO 1975, Singh *et al.* 1984).

As regards the point of entrance into the sea it is difficult to guess but the two possibilities are: through the Mahanadi delta at Paradip (40 km south-west of Gahirmatha) or through the Brahmani-Baitarani systems. This migration may be purely accidental and perhaps had taken place or commenced during the high flood in September last, and this movement cannot be compared with the seasonal movement of the Asian giant turtle *Pelochelys bibroni* which leaves the freshwaters



Photo. 1. Gharial on the coast.

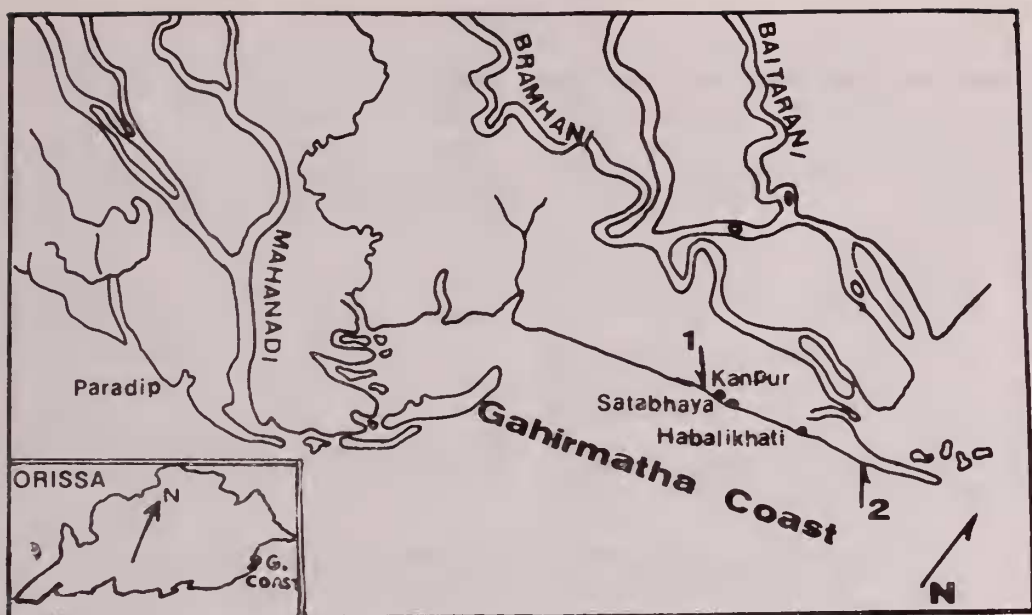


Fig. 1. Mouths of major rivers near Gahirmatha, Orissa where 3 m long female gharial was sighted on the coast. 1. First sighting (30.1.1985).
2. Last sighting (2.2.1985). 1-2 distance: 13.8 km.

of Brahmani and Baitarani and shares the same nesting beach with the olive ridley (*Lepidochelys olivacea*) and during which season it may occasionally enter the sea.

ACKNOWLEDGEMENTS

We thank the Forest Department, Govt. of

Orissa for help and support on this survey of the coast-line and the Sambalpur University and Wildlife Institution of India, Govt. of India, respectively for facilities and to L. A. K. Singh for help in the preparation of the note.

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REFERENCES

- ANNANDALE, N. (1915): Fauna of the Chilka Lake. Reptiles and Batrachia. *Memoirs of the Indian Museum* 5: 167-174.
- BHANJ DEO, S. N. (Undated): Flood control and allied problems of Orissa rivers. Government of Orissa Publication.
- BUSTARD, H. R. & SINGH, L.A.K. (1984): Movement of wild gharial, *Gavialis gangeticus* (Gmelin) in River Mahanadi, Orissa (India). *British J. Herpetol.* 6.
- FAO (1975): India. Gharial and crocodile conservation management in Orissa (based on the work of H. R. Bustard). FAO: IND: 71: 033 December, 1975. FAO Rome.
- SINGH, L. A. K. (1978): Ecological studies on the gharial, *Gavialis gangeticus* (Gmelin) Reptilia, Crocodilia). Ph.D. thesis, Utkal University, Bhubaneswar.
- SINGH, L. A. K. & BUSTARD, H. R. (1982a): Geographical distribution of the gharial *Gavialis gangeticus* (Gmelin) in Orissa, India. *British J. Herpetol.* 6, 259-260.
- _____ (1982b): The extinction of the gharial *Gavialis gangeticus* (Gmelin) from the Brahmani and Baitarani rivers of Orissa. *J. Bombay nat. Hist. Soc.* 79(2): 424-425.
- SINGH, L. A. K., KAR, S. K. & CHOUDHURY, B. C. (1984): Indian Crocodylians: A 10-year review of Management. Paper presented at the 7th working meeting of the Crocodile specialist group (IUCN/SSC) Caracas, Venezuela, S. America.

19. UNUSUAL EGG-LAYING IN A CAPTIVE SOFTSHELLED TURTLE *TRIONYX GANGETICUS* (CUVIER)

Turtles have a remarkable ability to survive under very circumscribed captive conditions but then their normal behaviour is altered. Excepting a few descriptions like of *Trionyx sinensis* (Mitsukuri 1895) where the turtles were maintained in semi-natural conditions, most other data on nesting in captivity are not reported because the behaviour is unnatural (Moll 1979). While conducting a study on the reproductive physiology of the freshwater turtle *Trionyx gangeticus*, a turtle weighing 7 kg and 46 cm carapace length was purchased from the local fish market during the last week of September, 1981 and brought to the laboratory where it was kept in a tank measuring 1.5 x 0.4 x 0.3 m. The turtle ate very little in the laboratory but remained active. In the tank it laid 7 eggs during the first week of October, 2 eggs on November 5 and 3 eggs on December 22, when on dissection three more eggs were found intact in the left oviduct. The right oviduct was empty.

Each ovary also contained large vitellogenic follicles 19.3 ± 1.926 mm in diameter. Only 6 fresh corpora lutea were present in the ovaries but a number of atretic follicles were discernible by gross inspection, indicating that the 6 eggs found in December may be of a new clutch as the number corresponds with the corpora lutea found in the ovaries. All 15 eggs were well calcified, each with a weight of 15 g and diameter 29 mm.

A natural clutch of small *T. gangeticus* (mean carapace length 45 cm) have upto 15 eggs (Rao 1982, Singh, in press) and of large turtles with 60 cm (mean) carapace length have upto 40 eggs (Rao 1982). In the observations reported above, the clutches of 7 and 2 eggs found during October and November in a span of 4 weeks are believed to comprise a single natural clutch that had completely developed by the time the turtle was transferred to captivity. The eggs (3 nos.) laid on December 22 and those found in the oviduct (3